

Application/Control No.: 10/519,954
Examiner: SINGH, ARTI R

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REMARKS

Claim 1 has been amended to more clearly characterize the features of a flexible ballistic composite material of the present invention. The disclosures of claims 2 and 3 have been incorporated into a newly amended claim 1.

The Examiner has provisionally rejected claims 1-27 on the grounds of non-statutory obvious-type double patenting as being unpatentable over claims 1-27 of copending Application No.: 10/555,966 (herein the '966 application).

Applicant respectfully disagrees.

As the Examiner points out in section 1 of the pending Office Action, a non-statutory obviousness type double patenting rejection is appropriate when the conflicting claims are not identical, but at least once examined application claim is not patentably distinct from the reference claims(s) because the examined application claim is either anticipated by or would have been obvious over, the reference claims. While it is true that the '966 application and the present application share a common inventor and general subject matter, it is clear that the claims of the two applications are patently distinct from one another. The present invention, specifically amended claim 1, is directed to a ballistic composite material comprising a plurality of fibers arranged in overlying layers. At least a portion of these fibers are impregnated or wetted with a viscous or visco-elastic liquid having non-Newtonian behavior. The '996 application is limited to a laminate comprising a layer of yarn and polymer. Additionally, the '996 application fails to point out a liquid having viscous or visco-elastic properties and exhibiting non-Newtonian behavior.

The '966 application fails to point out each and every element found in the amended claim. Additionally, there is insufficient motivation to modify the '996 application to the point where the present application would be obvious in light of the

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'996 application's disclosure. Therefore, the claims of the present invention are neither anticipated nor obvious in light of the '966 application.

Applicant also points out that a double patenting rejection at this time would be premature considering that the cited reference has yet to issue as a patent.

Based on the foregoing, Applicant respectfully submits that the claims of the present invention are in proper form for allowance.

The Examiner has rejected claims 1-27 under 35 U.S.C. §103(a) as being unpatentable over WO 91/12136 issued to Blake in view of GB 2349798 issued to Plant or United States Patent No.: 5,854,143 issued to Schuster.

Claim 1, as amended, points out non-obvious subject matter because it recites an anti-penetration ballistic composite material in which the improvement in the anti-ballistic behavior is achieved without impairing the flexibility properties of the material. These features are particularly applicable to body armor, which needs to be highly resistant to penetration but flexible enough to permit a full range of movement of during combat situations. Amended claim 1 recites impregnating or wetting at least a portion of ballistic fibers arranged on overlaying layers with a polymer which is in the form of a viscous or visco-elastic liquid and which retains its fluid characteristics even after impregnation or application. The cited prior art fails to recite all the elements found in amended claim 1.

The Blake reference is limited to a molded composite material in continuous roll form and methods of making the same. No polymers in liquid form are mentioned or suggested in the cited reference. Additionally, the Blake reference is directed to the production of a composite material in the form of a continuous roll form which permits the material to be produced in a more economical manner.

Lastly, the composite material of Blake comprises a thermosetting resin-impregnated sheet which is cured by exposure to heat and pressure to cause the resin-impregnated sheet and a sheet of film to adhere to one another. In contrast thereto the composite material recited in amended claim 1 provides that the polymer

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impregnation of the fibers is not accomplished with cured thermosetting resin but rather a polymer in viscous or visco-elastic liquid form. Said polymers retain their liquid form even after application to the fibers.

The Plant reference is directed to a protective member comprising an envelope encapsulating an energy absorbing material which remains soft and flexible until it is subjected to an impact. The Plant reference recites an envelope which is a reservoir containing the energy absorbing material and prevents egress thereof (page 3 line 4). The Plant reference does not teach the impregnation of ballistic fibers with a polymer in the form of a viscous – or visco-elastic liquid as found in amended claim 1 in order to improve the resistance of the ballistic fibers without impairing the flexibility thereof.

In addition, the protective member of the Plant reference is not a ballistic material but merely a device for absorbing the energy used in conjunction with other protective means such as those illustrated in Figs. 3 to 10 for making Active Protection Systems (page 6) sold to motorcyclists. These systems (Dianese) are unsuitable for ballistic purposes. A projectile can easily pass through the protective member disclosed by the Plant reference.

In contrast thereto, the polymer in the form of a viscous or visco-elastic liquid, as recited in amended claim 1, allows for improved ballistic performance of an anti-ballistic structure without impairing the flexibility of the composite material. This problem is not addressed at all by the Plant reference. Therefore, there is lack of sufficient motivation to combine the teachings of the Blake reference and with those of the Plant reference. Additionally, even if there were sufficient motivation, which Applicant does not concede, any resulting combination fails to point out all the elements of the present invention. The Blake reference fails to recite the use of viscous or visco-elastic polymers. The Plant reference fails to recite impregnating the fibers with viscous or visco-elastic polymers. Therefore any resulting combination of Blake and Plant results in a combination that is limited to using resin-cured polymers or envelopes containing energy absorbing materials.

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The Plant reference discloses that the encapsulating envelope can be made, *inter alia*, of fabric. However, in the Plant reference, said fabric is only intended as a material for containing the energy absorbing material. The Plant reference is not directed to using the ballistic fibers wetted with a polymer in the form of a viscous or viscous elastic liquid to achieve a ballistic performance enhancement of an anti-ballistic structure without impairing its flexibility.

The Schuster reference teaches a material for protective clothing wherein one or more layers of the anti-ballistic package comprise a flat structure that has been saturated or charged with organic dilatancy agents. The dilatancy agent is a solid organic compound applied in the form of dispersions to the flat structures (Col. 3, lines 42-55).

The Examiner suggests that it would have been obvious to employ the dilatants polymer of the Schuster reference as resin material in the Blake's composite. Applicant respectfully disagrees.

The Schuster reference neither teaches nor suggests impregnating anti-ballistic fibers with a viscous or visco-elastic liquid, as claimed in amended claim 1, in order to effectively dissipate energy along the fibers without impairing the flexibility of such fibers. The Schuster reference is limited to the application of dispersions of dilatancy. Thus imparting polymers to flat structures intended for processing into protective clothing.

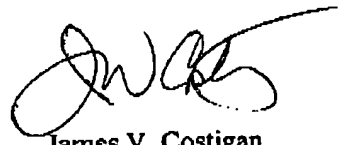
Combining this reference with Blake fails to point out all the elements of the amended claim 1. It is unclear from Schuster, which flat structure of Blake would be imparted with polymers. The flat sheet (11) disclosed by Blake is already impregnated with a thermosetting or thermoplastic resin and as such, it is unsuitable to be saturated with a dispersion of the dilatancy agent of Schuster. In addition, the mere combination of the flat structure saturated with the dilatancy agent of Schuster with the composite structure of Blake would produce a composite structure having increased weight, rigidity and reduced flexibility.

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As such, amended claim 1 can not be obvious in view of a combination of Schuster and Blake.

Based on the above, Applicant respectfully submits that the claims of the present invention are in proper form for allowance. Favorable consideration and early allowance are therefore respectfully requested and earnestly solicited.

Respectfully Submitted,



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